OXIDIZING UNDESIRED COMPOUNDS RESIDENT WITHIN LIQUID ABSORBENT COMPOUNDS, REDUCING ATMOSPHERIC POLLUTION, REGENERATING A LIQUID ABSORBENT AND CONSERVING FUEL USAGE ASSOCIATED WITH REBOILER UTILIZATION

Abstract of the Disclosure

An improved method and apparatus for oxidizing undesired compounds residing within a liquid glycol based absorbent wherein the compounds are heated within a reboiler chamber to their boiling point to effectuate the production of vaporized effluents. Once so heated the absorbent 's vaporized effluents rise upwardly exiting the reboiler chamber and enter a reflux tower wherein they are partially condensed via a condenser means embodied within the interior of the tower. The residual uncondensed effluents are then transported to and first heated via a vaporizer / heat exchanger in heat exchange, thus effectuating the vaporization of any ambient condensed liquids contained within the effluents. The revaporized effluents then enter the invention's thermal oxidizer combustion chamber where they are second heated to a temperature necessary to effectuate destruction of undesirable compounds, such as but not limited to benzene, toluene and xylene. The combustion chamber includes a burner fed as necessary by supplemental fuel, such as natural fuel gas. A temperature control throttling mechanism throttles the introduction of such gas as necessary to maintain the temperature necessary to effectuate and maintain destruction of undesirable compounds. A specially designed reduced diameter section of the combustion chamber enhances the mixing process of effluents traversing the chamber. The combustion chamber is in fluid communication with a plurality of tubes which pass through the reboiler. The tube bundle generates external tube surface temperatures sufficient to raise a liquid glycol based absorbent in contact therewith to its boiling point. The second heated effluents are then introduced to and through a thermal oxidizer vent stack allowing for the exiting of said effluents from the combustion chamber

at 90° angle to effectuate a redirection of flow which serves as an additional mechanism to improve oxidation efficiency. Venting mechanisms located in the invention's still / reflux tower and oxidizer vent stack are controlled in a coordinated manner to ensure temperature consistency of effluents traversing the invention's internal combustion chamber and tube bundle. An alternative embodiment of the present invention would allow the further utilization of an optional glycol heat recovery section and/or sparging or stripping pipe whereby rich glycol containing undesirable compounds is first introduced and routed through the optional heat exchanger, prior to entering the reboiler section of the instant invention. The optional sparging or stripping pipe of the invention provides a means by which stripping gas percolates through a regenerated liquid glycol based absorbent to vaporize and remove water. The stripping gas then exits through the top of the sparging or stripping pipe where it meets and mixes with other gases and vapors.